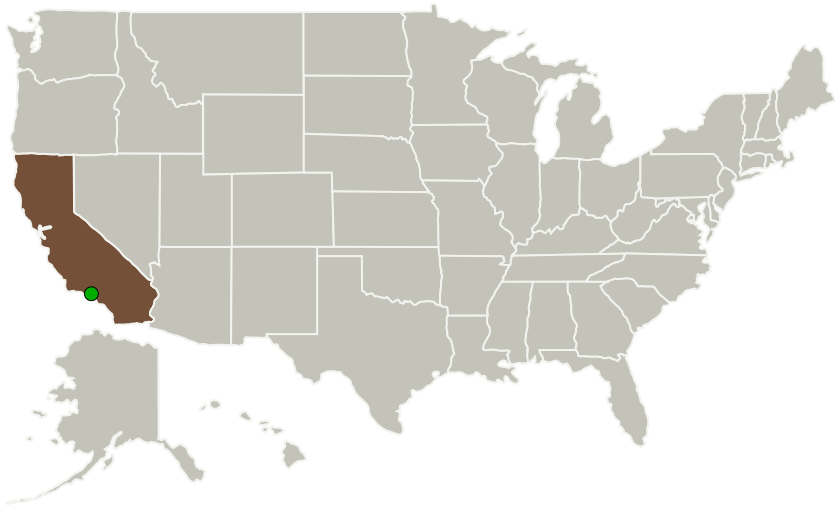
Miniature Optical Isolator, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

To address NASA's need for miniature optical isolators in atom interferometry applications, Physical Optics Corporation (POC) proposes to develop a miniature optical isolation technology based on magnetic photonic crystals optimized at wavelengths in the visible and NIR range. The proposed optical isolator design is based on enhanced magneto-optical effects in photonic crystals. With the proper lattice parameter and magneto-optical material, high optical transmission and large Faraday rotation can be achieved simultaneously at a target wavelength. A proposed device, occupying <0.1 cc, is expected to achieve high optical transmittance (forward loss <2 dB) and excellent optical isolation (extinction >40 dB); therefore, it is suitable for applications in various compact atom interferometers. In Phase I, POC will demonstrate the feasibility of the proposed technology in the visible spectral range and provide a Phase II prototype design. In Phase II, the technology will be further optimized and tested in operational environments.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Physical Optics Corporation	Lead Organization	Industry	Torrance, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Miniature Optical Isolator, Phase I

Table of Contents

Miniature Optical Isolator, Phase I

Completed Technology Project (2015 - 2015)

Primary U.S. Work Locations
California

Project Transitions

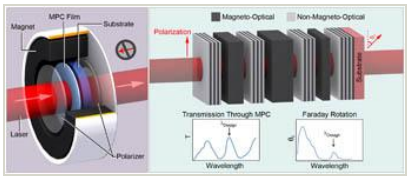
June 2015: Project Start

December 2015: Closed out

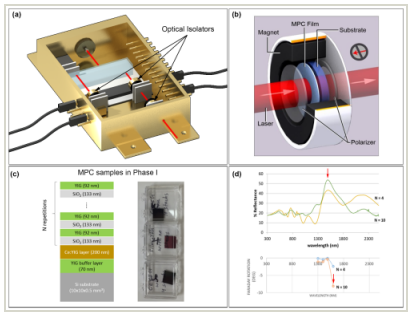
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139107)*

Images



Briefing Chart
Miniature Optical Isolator Briefing Chart
(https://techport.nasa.gov/image/127159)



Final Summary Chart Image
Miniature Optical Isolator, Phase I Project Image
(https://techport.nasa.gov/image/136101)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Physical Optics Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Victor Grubsky

Co-Investigator:

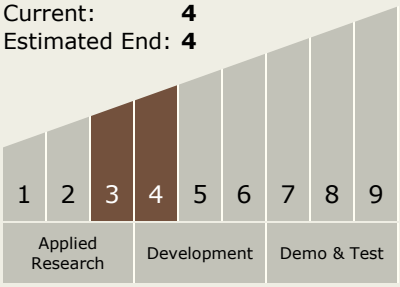
Jae H Choi

Miniature Optical Isolator, Phase I

Completed Technology Project (2015 - 2015)

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.3 Optical Components

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System